FIG. 1

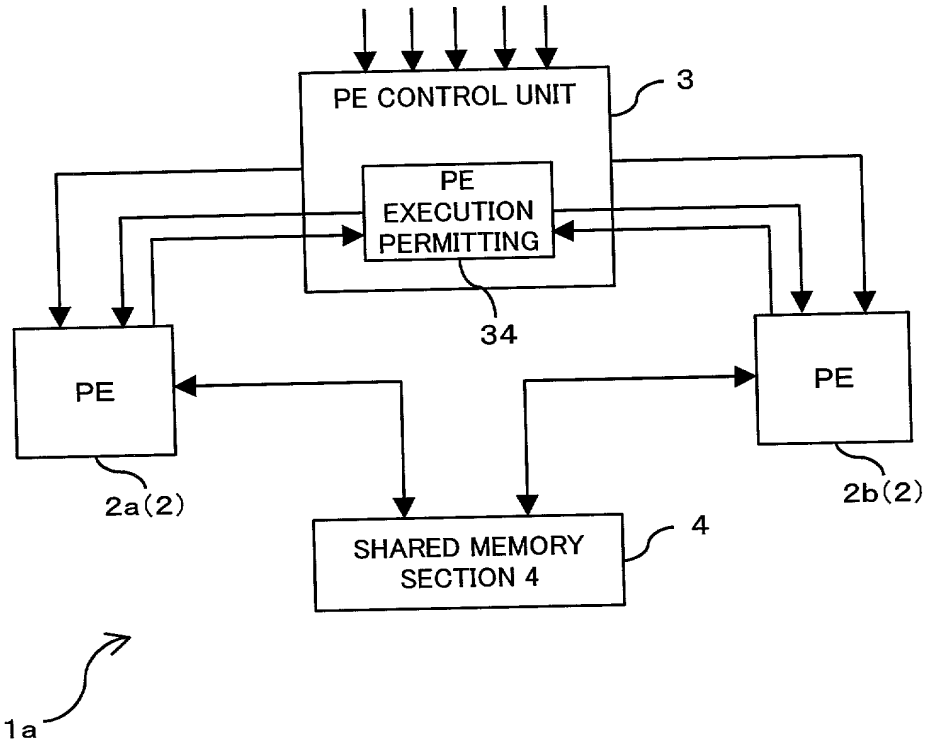

PE CONTROL UNIT
3
PE
EXECUTION
PERMITTING
34
PE
2a(2)
PE
2b(2)
SHARED MEMORY
SECTION 4
4
1a

FIG. 2

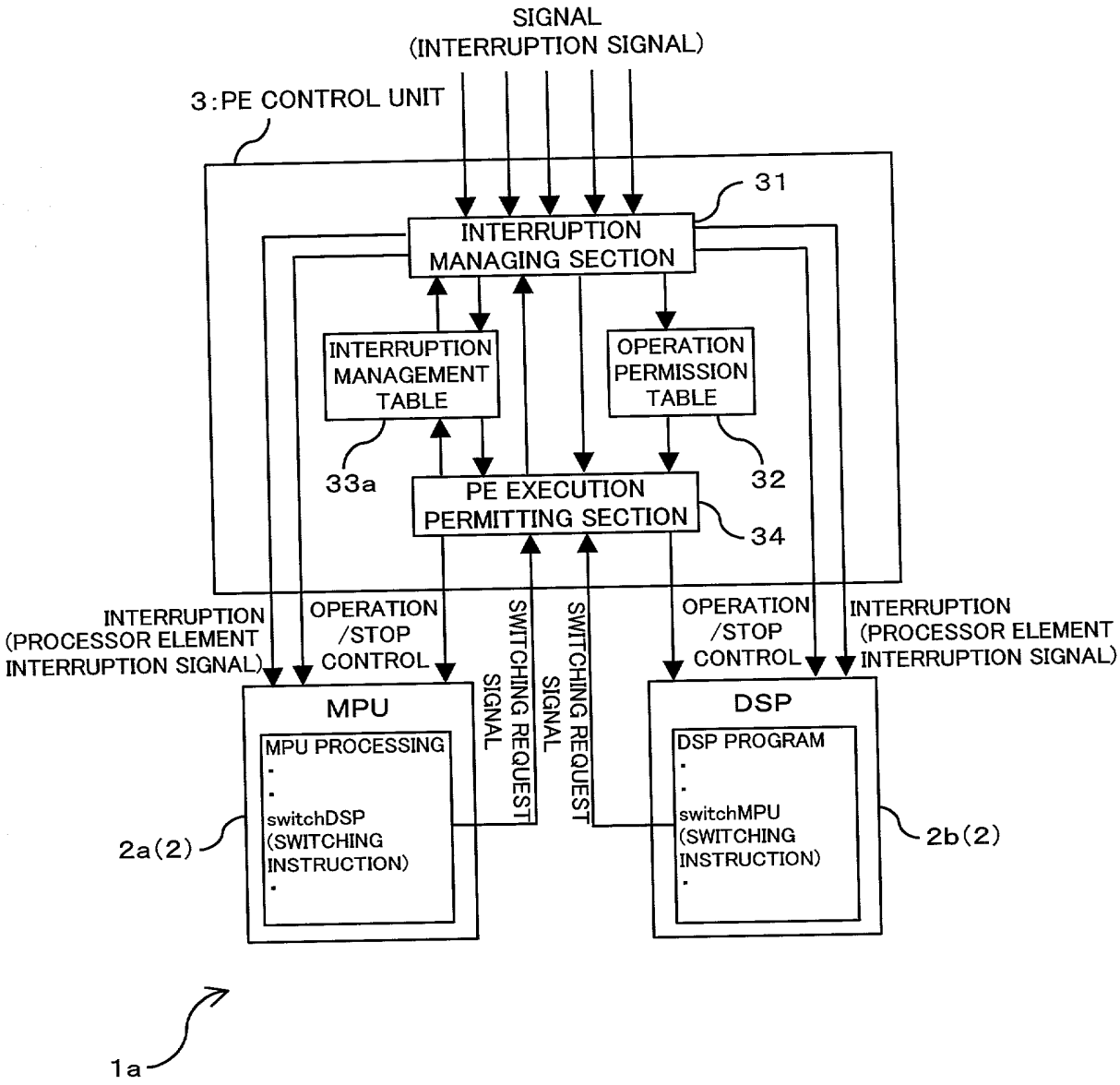

SIGNAL
(INTERRUPTION SIGNAL)
3:PE CONTROL UNIT
31
INTERRUPTION MANAGING SECTION
INTERRUPTION MANAGEMENT TABLE
OPERATION PERMISSION TABLE
33a
32
PE EXECUTION PERMITTING SECTION
34
INTERRUPTION (PROCESSOR ELEMENT INTERRUPTION SIGNAL)
OPERATION /STOP CONTROL
SWITCHING REQUEST SIGNAL
SWITCHING REQUEST SIGNAL
OPERATION /STOP CONTROL
INTERRUPTION (PROCESSOR ELEMENT INTERRUPTION SIGNAL)
MPU
MPU PROCESSING
switchDSP (SWITCHING INSTRUCTION)
DSP
DSP PROGRAM
switchMPU (SWITCHING INSTRUCTION)
2a(2)
2b(2)
1a

FIG. 3

PE NUMBER	EXECUTION PERMISSION FLAG
1(PE2a)	0
2(PE2b)	1
⋮	⋮
N	0

FIG. 4

33a

INTERRUPTION NUMBER	INTERRUPTION SUBJECT	VECTOR NUMBER	PRIORITY
1	ACTIVE	1	1
2	ACTIVE	2	N
⋮	⋮	⋮	⋮
N	ACTIVE	M	2

FIG. 5

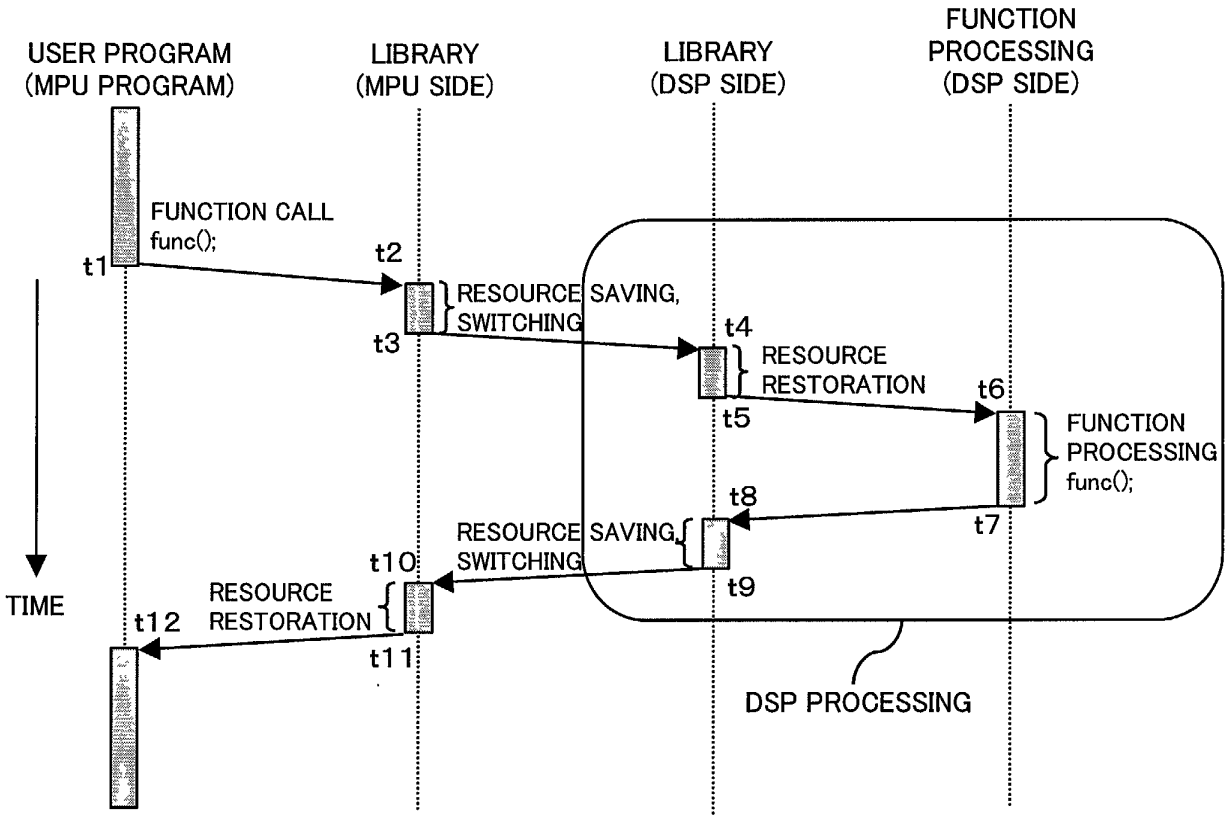

USER PROGRAM
(MPU PROGRAM)
LIBRARY
(MPU SIDE)
LIBRARY
(DSP SIDE)
FUNCTION
PROCESSING
(DSP SIDE)
FUNCTION CALL
func();
t1
t2
RESOURCE SAVING,
SWITCHING
t3
t4
RESOURCE
RESTORATION
t5
t6
FUNCTION
PROCESSING
func();
t7
t8
RESOURCE SAVING,
SWITCHING
t9
t10
RESOURCE
RESTORATION
t11
t12
TIME
DSP PROCESSING

FIG. 6

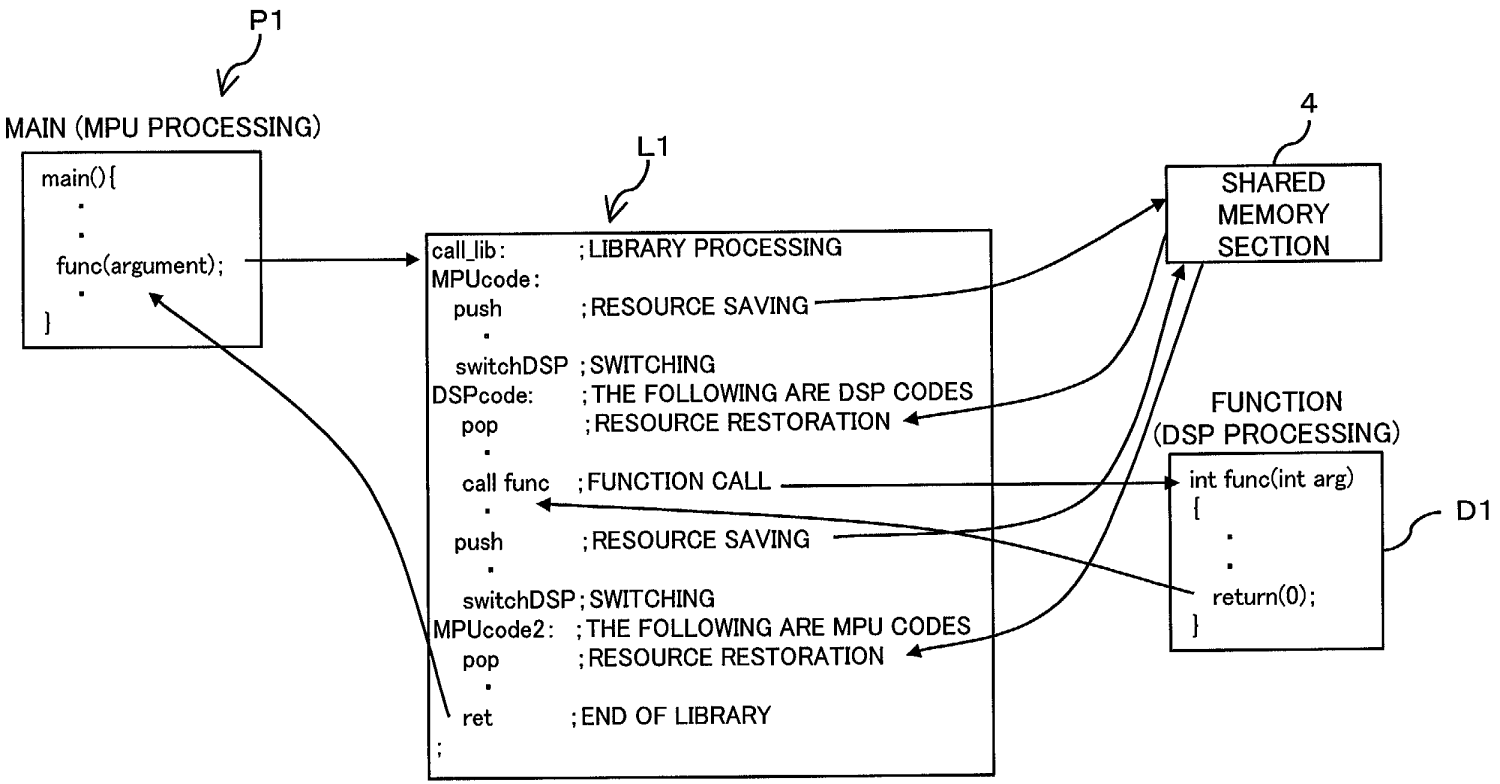

P1
MAIN (MPU PROCESSING)
main(){
func(argument);
}
L1
call_lib: ;LIBRARY PROCESSING
MPUcode:
push ;RESOURCE SAVING
switchDSP ;SWITCHING
DSPcode: ;THE FOLLOWING ARE DSP CODES
pop ;RESOURCE RESTORATION
call func ;FUNCTION CALL
push ;RESOURCE SAVING
switchDSP;SWITCHING
MPUcode2: ;THE FOLLOWING ARE MPU CODES
pop ;RESOURCE RESTORATION
ret ;END OF LIBRARY
;
4
SHARED MEMORY SECTION
FUNCTION (DSP PROCESSING)
int func(int arg)
{
return(0);
}
D1

FIG. 7

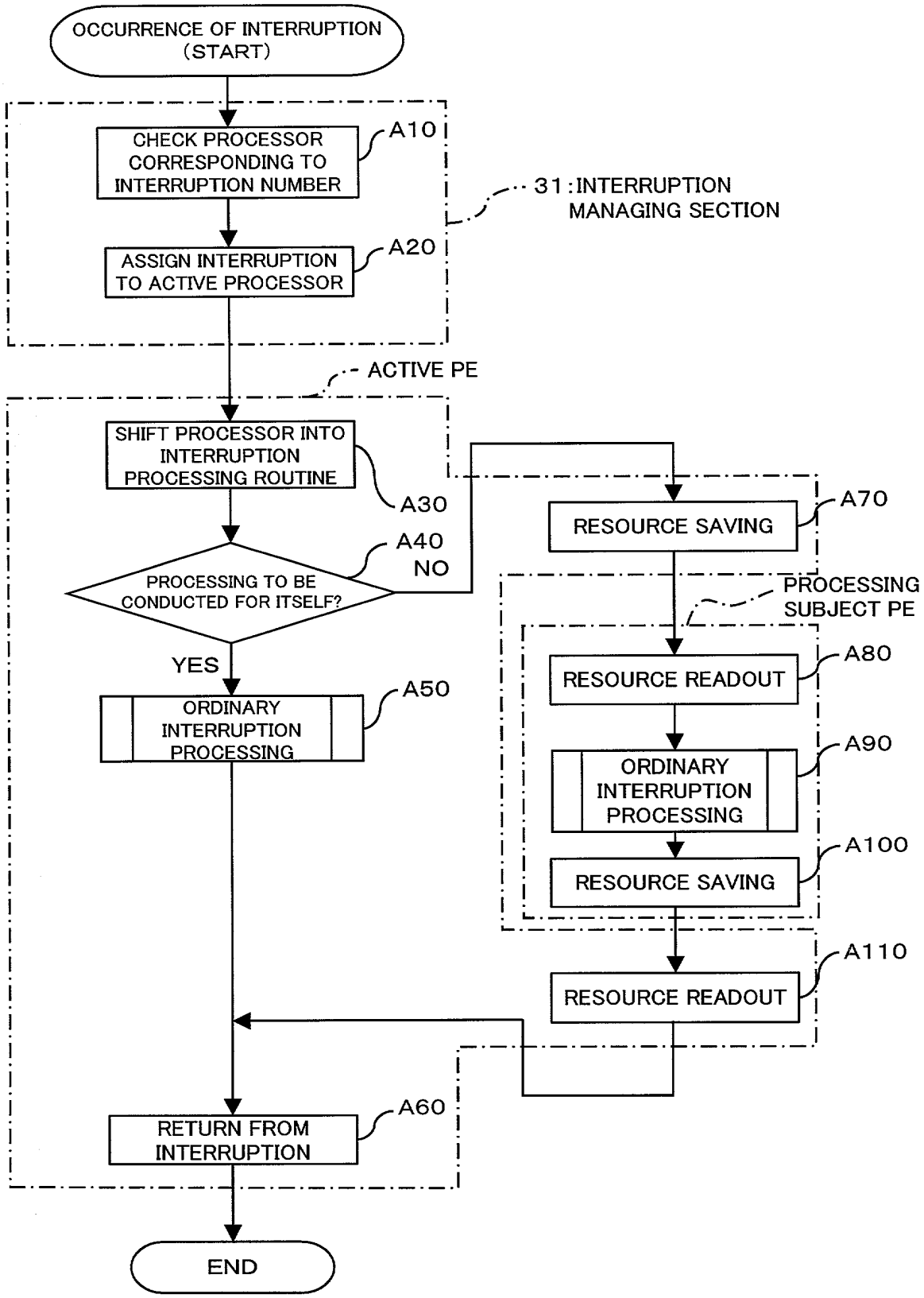

OCCURRENCE OF INTERRUPTION (START)
CHECK PROCESSOR CORRESPONDING TO INTERRUPTION NUMBER
A10
31 : INTERRUPTION MANAGING SECTION
ASSIGN INTERRUPTION TO ACTIVE PROCESSOR
A20
ACTIVE PE
SHIFT PROCESSOR INTO INTERRUPTION PROCESSING ROUTINE
A30
A40
NO
PROCESSING TO BE CONDUCTED FOR ITSELF?
YES
ORDINARY INTERRUPTION PROCESSING
A50
RESOURCE SAVING
A70
PROCESSING SUBJECT PE
RESOURCE READOUT
A80
ORDINARY INTERRUPTION PROCESSING
A90
RESOURCE SAVING
A100
RESOURCE READOUT
A110
RETURN FROM INTERRUPTION
A60
END

FIG. 8

33b

INTERRUPTION NUMBER	INTERRUPTION SUBJECT	VECTOR NUMBER	PRIORITY
1	PE2a	1	1
2	PE2a	1	N
⋮	⋮	⋮	⋮
N	PE2a	M	2

FIG. 9

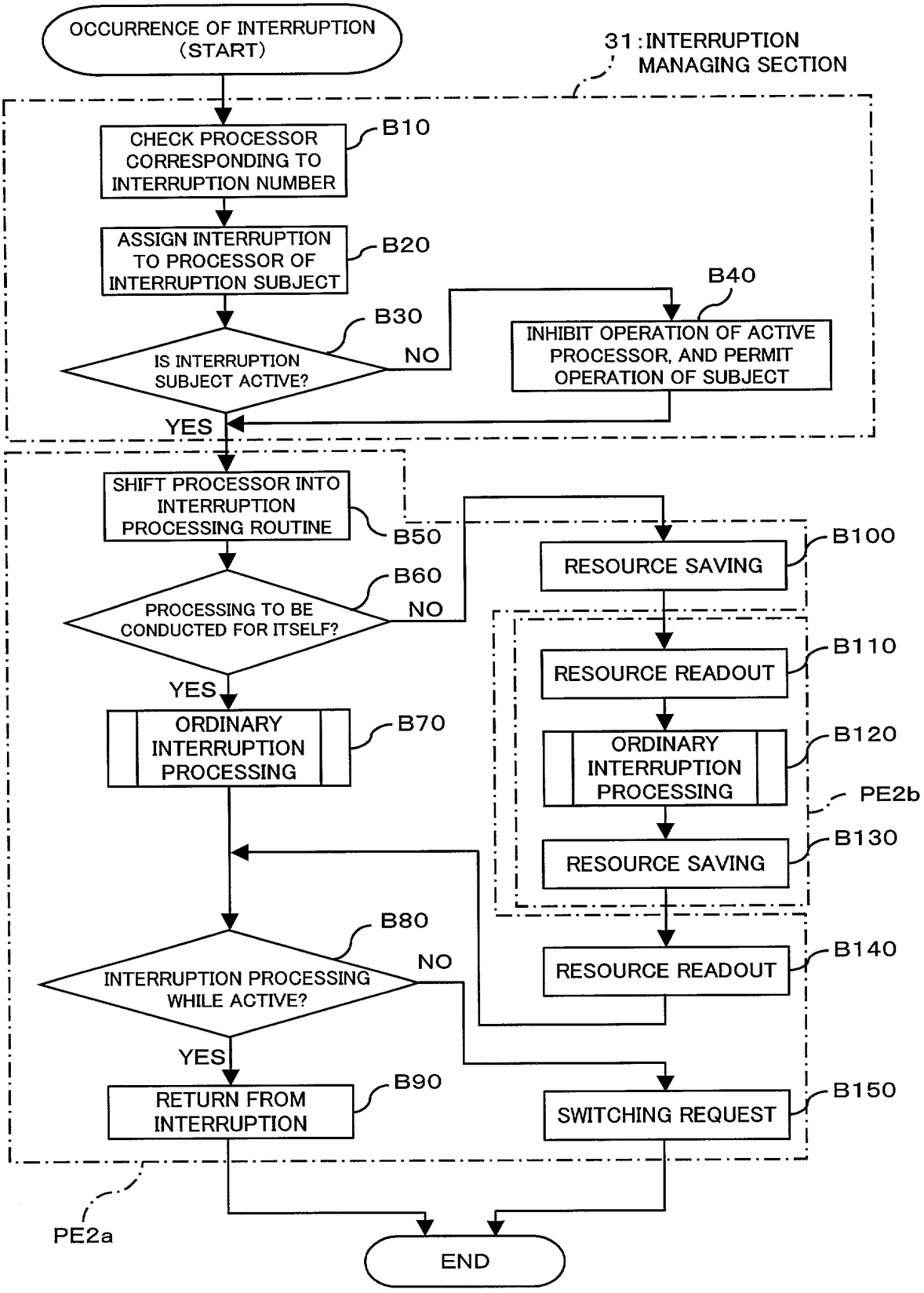

OCCURRENCE OF INTERRUPTION (START)
31 : INTERRUPTION MANAGING SECTION
CHECK PROCESSOR CORRESPONDING TO INTERRUPTION NUMBER
B10
ASSIGN INTERRUPTION TO PROCESSOR OF INTERRUPTION SUBJECT
B20
B40
B30
IS INTERRUPTION SUBJECT ACTIVE?
NO
INHIBIT OPERATION OF ACTIVE PROCESSOR, AND PERMIT OPERATION OF SUBJECT
YES
SHIFT PROCESSOR INTO INTERRUPTION PROCESSING ROUTINE
B50
B100
RESOURCE SAVING
B60
PROCESSING TO BE CONDUCTED FOR ITSELF?
NO
B110
RESOURCE READOUT
YES
ORDINARY INTERRUPTION PROCESSING
B70
B120
ORDINARY INTERRUPTION PROCESSING
PE2b
B130
RESOURCE SAVING
B80
INTERRUPTION PROCESSING WHILE ACTIVE?
NO
B140
RESOURCE READOUT
YES
RETURN FROM INTERRUPTION
B90
B150
SWITCHING REQUEST
PE2a
END

FIG. 10

33c

INTERRUPTION NUMBER	INTERRUPTION SUBJECT	VECTOR NUMBER	PRIORITY
1	PE2b	1	1
2	PE2a	1	N
⋮	⋮	⋮	⋮
N	PE2a	M	2

FIG. 11

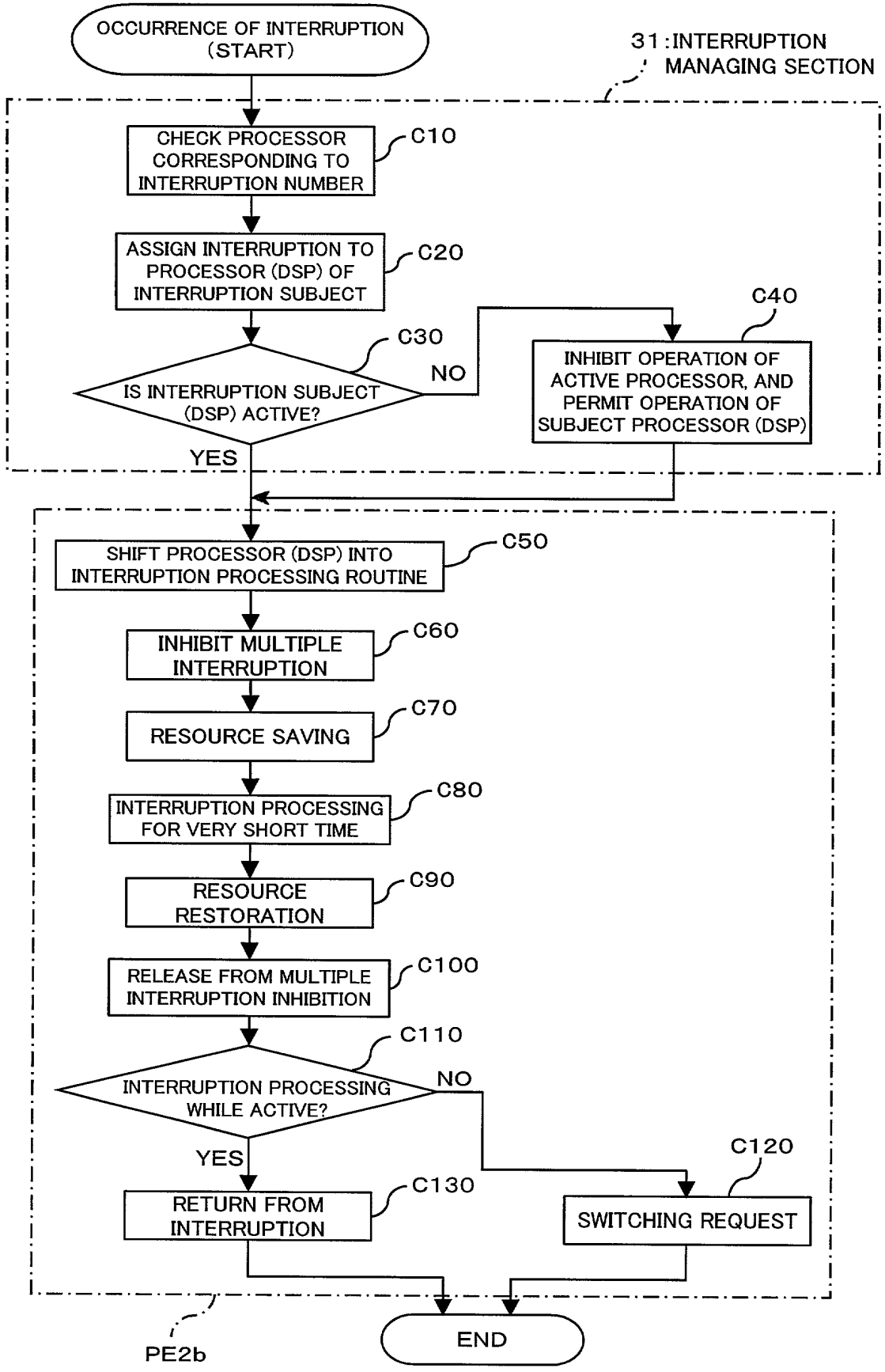

OCCURRENCE OF INTERRUPTION (START)
31 : INTERRUPTION MANAGING SECTION
CHECK PROCESSOR CORRESPONDING TO INTERRUPTION NUMBER
C10
ASSIGN INTERRUPTION TO PROCESSOR (DSP) OF INTERRUPTION SUBJECT
C20
C40
C30
IS INTERRUPTION SUBJECT (DSP) ACTIVE?
NO
INHIBIT OPERATION OF ACTIVE PROCESSOR, AND PERMIT OPERATION OF SUBJECT PROCESSOR (DSP)
YES
SHIFT PROCESSOR (DSP) INTO INTERRUPTION PROCESSING ROUTINE
C50
INHIBIT MULTIPLE INTERRUPTION
C60
RESOURCE SAVING
C70
INTERRUPTION PROCESSING FOR VERY SHORT TIME
C80
RESOURCE RESTORATION
C90
RELEASE FROM MULTIPLE INTERRUPTION INHIBITION
C100
C110
INTERRUPTION PROCESSING WHILE ACTIVE?
NO
YES
C120
RETURN FROM INTERRUPTION
C130
SWITCHING REQUEST
PE2b
END

FIG. 12

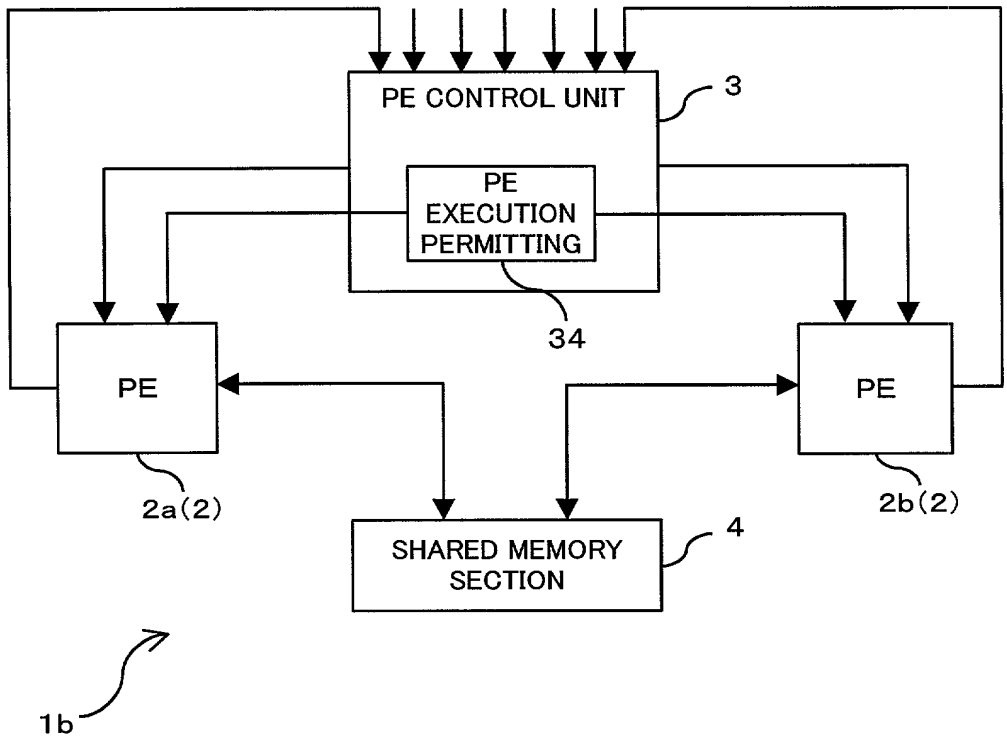
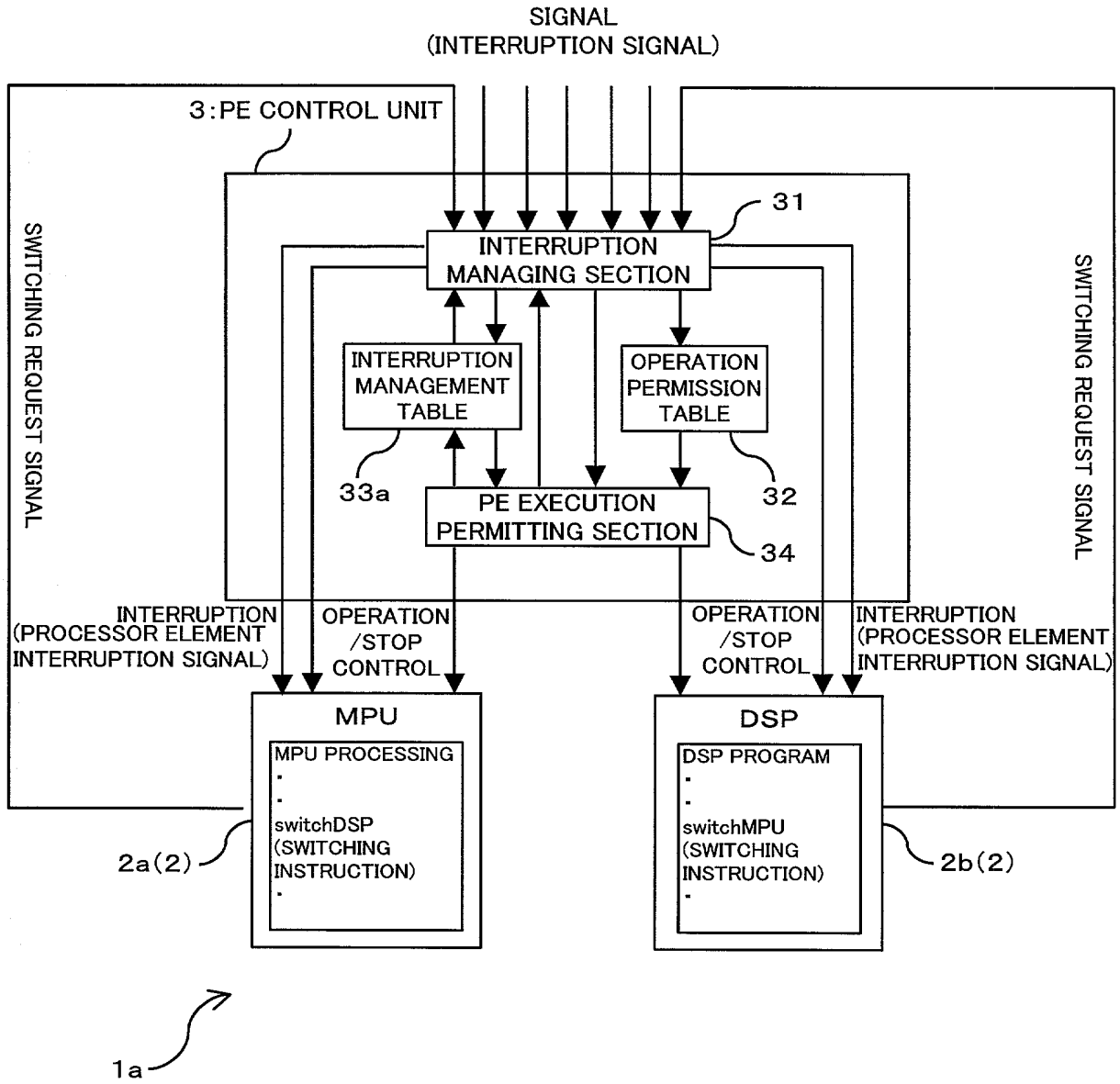

PE CONTROL UNIT
3
PE
EXECUTION
PERMITTING
34
PE
PE
2a(2)
2b(2)
SHARED MEMORY
SECTION
4
1b

FIG. 13


SIGNAL
(INTERRUPTION SIGNAL)
3:PE CONTROL UNIT
31
INTERRUPTION MANAGING SECTION
SWITCHING REQUEST SIGNAL
SWITCHING REQUEST SIGNAL
INTERRUPTION MANAGEMENT TABLE
OPERATION PERMISSION TABLE
33a
32
PE EXECUTION PERMITTING SECTION
34
INTERRUPTION (PROCESSOR ELEMENT INTERRUPTION SIGNAL)
OPERATION /STOP CONTROL
OPERATION /STOP CONTROL
INTERRUPTION (PROCESSOR ELEMENT INTERRUPTION SIGNAL)
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switchDSP (SWITCHING INSTRUCTION)
DSP
DSP PROGRAM
switchMPU (SWITCHING INSTRUCTION)
2a(2)
2b(2)
1a